TOTAL OUTFIT.

1	£740	0	0
2	400	0	0
3	300	0	0
4	440	0	0
5	1100	0	0
	£2980	0	0

C.—*Expenditure during and prior to the Organization of the Expedition.*

Expenses in Europe.....	£100	0	0
Passage money for the officers to Australia.....	380	0	0
Probable expenditure prior to the organization	400	0	0
Total	£880	0	0

GRAND TOTAL EXPENDITURE.

A	£17,675	0	0
B	2,980	0	0
C	880	0	0
	£21,535	0	0

II. "On some New Derivatives of Acetone." By MAXWELL SIMPSON, M.D., F.R.S. Received April 18, 1868.

The compounds which form the subject of the present paper came accidentally under my notice whilst I was engaged in an unsuccessful attempt to form leucic acid by a new synthesis.

By saturating a mixture of acetone and absolute alcohol with dry hydrochloric acid gas, I had hoped to form a body having the composition

$$C_5H_{11}OCl - C_3H_6O + C_2H_6O + HCl = C_5H_{11}OCl + H_2O,$$

and that this, when treated successively with cyanide of potassium and caustic potash, would have yielded the desired acid according to the following equations:—

$$C_5H_{11}OCl + KCy = C_5H_{11}OCy + KCl,$$

and

$$C_5H_{11}OCy + \left.\begin{matrix}K\\H\end{matrix}\right\}O + \left.\begin{matrix}H\\H\end{matrix}\right\}O = C_6H_{11}KO_3 + NH_3.$$

By saturating the above mixture with hydrochloric acid, I obtained, it is true, a large quantity of a chlorinated oil; but I could not ascertain whether it was the compound I expected or not, as I found it impossible to render

it sufficiently pure for analysis. I therefore subjected it directly (having simply washed it with a dilute solution of carbonate of soda) to the action of the before-mentioned reagents *. The results were altogether unexpected.

I have since ascertained that the chlorinated oil can be obtained without the intervention of alcohol. I will now give a detailed account of my experiments.

Dry hydrochloric acid gas was passed to saturation into a quantity of pure acetone contained in a glass vessel surrounded with cold water. The product was set aside for ten or twelve days, and then well washed with a dilute solution of carbonate of soda. Equal weights of the oil thus formed and of pure cyanide of potassium were then introduced into a glass balloon together with a large quantity of alcohol. The balloon was attached to a reversed Liebig's condenser, and subjected for about twelve hours to the temperature of a water-bath. At the expiration of this time its contents were, when quite cold, filtered, and the precipitate well washed with cold alcohol, and then with cold distilled water till the wash-water ceased to give a precipitate with nitrate of silver. A white powder was thus obtained which was insoluble in cold water and in cold alcohol. Boiling alcohol, however, dissolved it to a small extent, from which it crystallized on cooling in beautiful shining plates like naphthaline. These sublime at a high temperature (about 300° C.), apparently without decomposition. It is a neutral body and contains nitrogen. It does not evolve ammonia when heated with an alcoholic solution of caustic potash. It is decomposed by nitrous acid, with the production of a compound having acid properties. The composition of this body I hope to be able to give in a future communication.

I will now turn to the alcoholic solution filtered from the neutral body I have just described. This I introduced into a balloon together with some sticks of caustic potash. The balloon was then attached to a reversed Liebig's condenser, and exposed to the temperature of a water-bath till ammonia had ceased to be evolved. When this was observed, the alcohol was distilled off and the residue dissolved in water. The solution was then neutralized with hydrochloric acid, filtered, evaporated considerably, and then treated with a large excess of the same acid. After standing for some time it became a mass of crystals. These were thrown upon a filter and washed with cold distilled water till the filtrate ceased to give a precipitate with nitrate of silver. The powder obtained in this way was readily purified by crystallizing from hot alcohol, and then from boiling water. From the latter solvent it separates in brilliant colourless prismatic needles, sometimes upwards of an inch in length. Dried at 100° C., these gave the following numbers on analysis, which accord sufficiently well with the formula $C_8 H_{13} NO_3$:—

* I had performed these experiments before the appearance of Baeyer's paper "Ueber die Condensationsproducte des Acetons," Annalen der Chemie, vol. cxl. p. 297.

	Theory.					
		Per cent.	I.	II.	III.	IV.
C_8	96	56·14	56·28	56·79		
H_{13}	13	7·60	7·97	8·21		
N	14	8·19	..	..	8·32	8·23
O_3	48	28·07				
	171	100·00				

I have also prepared and analyzed the silver-salt of this acid. The results I obtained confirmed the above formula.

	Theory.	Experiment.	
	Per cent.	I.	II.
Metallic silver ($C_8 H_{12} Ag NO_3$)	38·84	38·98	38·70 *

The salt was obtained in beautiful mother-of-pearl plates by boiling a solution of the acid with an excess of freshly prepared oxide of silver. It is very soluble in water, and is not much affected by light. It does not suffer decomposition when dried at 100° C.

The new compound has an acid reaction, and displaces carbonic acid from the soluble carbonates. It is insoluble in cold, pretty soluble in hot water and in cold alcohol, and sparingly soluble in ether. It melts at 171° C. The nitrogen appears to be retained with unusual force within the molecule of the new acid. It refuses to give it up in the form of ammonia when subjected to the action of an alcoholic solution of potash, a fact we have already learned from the manner of its formation. Neither can it be made to yield it up by exposing it to the action of nitrous gas. I have tried this gas upon a solution of the acid both in water and nitric acid. It dissolves in large quantity in strong hydrochloric acid, and, on standing, crystallizes out unaltered, not combining chemically with that body.

The salts of this acid are, as a general rule, very soluble in water. The neutralized acid yields no precipitate with nitrate of silver, corrosive sublimate, or chloride of barium. It renders a solution of acetate of lead but slightly turbid, and communicates a red colour to perchloride of iron without precipitating it.

The soda-salt is very soluble and does not crystallize well. It is prepared by neutralizing the acid with carbonate of soda. One molecule of the acid, assuming it to have the composition $C_8 H_{13} NO_3$, I found required exactly one molecule of pure and recently ignited carbonate of soda for complete neutralization. This experiment, and the composition of the silver-salt, render it highly probable that the acid is monobasic.

The mercury-salt crystallizes in beautiful pearly plates. It is prepared by boiling a solution of the acid with freshly precipitated oxide of mercury. It is a very soluble salt.

* The salt which served for this analysis was made from a freshly prepared batch of the acid.

When acetone is saturated with hydrochloric acid, several condensed compounds are formed, which remain in union with the acid. The question now arises, which of these compounds generate the acid we have just been studying? and which the neutral body? In the hope of determining this point, I prepared the two most important of these compounds in a state of purity, namely oxide of mesityle and phoron, and saturated them with hydrochloric acid gas. After the lapse of twelve hours the two saturated bodies were well washed with water, and treated separately with cyanide of potassium and caustic potash in the manner I have just described. The results were decisive. The mesityle compound yielded the acid, and the phoron compound the neutral body. The following equations will explain the formation of the acid:—

$$C_6H_{10}O+2HCl=C_6H_{12}OCl_2,$$

$$C_6H_{12}OCl_2+2KCy=C_6H_{12}OCy_2+2KCl,$$

and

$$C_6H_{12}OCy_2+\left.\begin{matrix}K\\H\end{matrix}\right\}O+\left.\begin{matrix}H\\H\end{matrix}\right\}O=\underset{\text{new acid.}}{\overset{\text{Potash-salt of}}{C_8H_{12}KNO_3}}+NH_3.$$

It will be observed that only one of the cyanogen atoms is transformed into C O O K.

The foregoing derivatives of acetone are, I think, in many respects very remarkable bodies. I therefore propose to submit them to a careful study. I propose also to ascertain whether or not the true aldehydes yield analogous bodies when treated in a similar manner.

III. "Researches on the Hydrocarbons of the Series C_nH_{2n+2}.—No. IV." By C. Schorlemmer. Communicated by Prof. G. G. Stokes. Received April 13, 1868.

On the relation between Boiling-point and Chemical Structure.

It is from researches published only during last year that we have obtained a more definite knowledge of the chemical structure of some of the hydrocarbons of the above series, so that we are enabled to explain the mode in which the carbon atoms are united. This has been achieved by obtaining these hydrocarbons by synthesis from other compounds, the structure of which is perfectly well known.

Thus Friedel and Ladenburg* prepared, by acting upon methylchloracetol, $C\left\{\begin{matrix}CH_3\\CH_3\\Cl_2\end{matrix}\right.$, with zincethyl, the hydrocarbon C_7H_{16}, which they call carbdimethyldiethyl, and which has the structure $C\left\{\begin{matrix}CH_3\\CH_3\\C_2H_5\\C_2H_5\end{matrix}\right.$. Butlerow†

* Ann. der Chem. und Pharm. vol. cxlii. p. 310.

† Ibid. vol. cxliv. p. 10.